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**Optical Measurements on Magnetolectric LSMO/PZT Bilayers** DISHENG CHEN, SRINIVAS POLISETTY, EVAN WOLFE, JINLING ZHOU, MIKEL HOLCOMB, West Virginia University, THANH TRA VU, JAN-CHI YANG, YING-HAO CHU, National Chiao Tung University — Fairly weak magnetolectric coupling observed in the only single phase material ( $\text{BeFeO}_3$ ) exhibiting magnetism and ferroelectricity at room temperature has pushed scientists to consider alternative systems. Multilayers prove promising theoretically and experimentally, however, most modern techniques are blind to the interfacial mechanisms causing the coupling. Without a full understanding of the physical mechanism for these effects, significant improvements in the design and multiple potential applications of magnetolectric coupling will be difficult to achieve. Optical measurements including second harmonic generation are crucial tools to solve this problem, as they provide complementary insight into the magnetic/ferroelectric properties and resulting carrier dynamics. For example, angular dependence SHG of magnetic  $\text{LaSrMnO}_3$  and ferroelectric  $\text{PbZrTiO}_3$  bilayers indicates the symmetry and magnetization as we vary thicknesses of the magnetic and ferroelectric layers and its implication to magnetolectric coupling.

Srinivas Polisetty  
West Virginia University

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